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DEBINDING AND SINTERING STUDY OF INJECTION MOULDED M2 HIGH SPEED STEEL USING BINDER WASTE PLASTIC BINDER SYSTEM

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ABSTRACT

Metal injection molding (MIM) is an effective way for producing small and complex-shape components in high production rate. Selection of binder and its removal in debinding process is a crucial stage in MIM process. In this study, the debinding and sintering characteristics of injection molded M2 HSS using plastic binder system has been investigated. The feedstock been formulated with 65vol% using M2 HSS with the binder contain of 55wt.% paraffin wax, 35wt.% thermoplastic waste plastic and 10wt.% staeric acid. Then, the moulded part was immersed in the n-haptane at the temperature $60°C$ in order to remove paraffin wax and stearic acid. The parts were rest at in the oven to make sure it completely dried. The result shows shrinkage occurred during solvent extraction. The effect of binder has been investigated. The sintering in vacuum atmosphere carried out in temperature range 1200°C - 1260°C. The soaking times for sintering are 10 minutes, 30 minutes and 60 minutes. The shrinkage occurred after sintering is about 14% compared before sintering. The sintered density is obtained about 8.11g/mm3 from the temperature 1220°C to 1260°C. The optimum strength get from temperature 1240°C with the value 3300MPa to 3500MPa.The effect of sintering temperature and soaking time has been discussed. This study investigated the physical and mechanical properties of sintered samples such as density, hardness, strength and elongation.

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